REMARKS

Claims 1-21 are presented for further examination. Claims 1, 3, 6-8, 11, and 15 have been amended.

In the Office Action mailed December 28, 2005, the Examiner rejected claims 1-10 and 15-20 under 35 U.S.C. § 112, first paragraph in that a means recitation does not appear in combination with another recited element of means and therefore was subject to an undue breadth rejection. In addition, claims 1-21 were rejected under 35 U.S.C. § 112, second paragraph in that it was unclear to the Examiner how the RFID transponder achieved its stated purpose because it lacked necessary structural elements. In addition, in claim 11 the limitation "the first distance" and the limitation "different modes of operation" lacked sufficient antecedent basis. With respect to claims 12-14, it was unclear to the Examiner what modes of operation the claims were referring to.

Turning to the merits, claims 1-21 were rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 6,489,883 ("Iiyama et al."). Claims 1-7, 15, and 17-20 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,317,309 ("Vercelotti et al."). Claims 8-14 were rejected as obvious over Vercelotti et al. Claims 1-7, 15, and 17-20 were rejected under 35 U.S.C. § 102(b) as anticipated by GB 2292866 ("Miyamoto").

Applicants respectfully disagree with the bases for the rejection and request reconsideration and further examination of the claims.

35 U.S.C. § 112 Rejections

Applicants have amended claims 1, 6, 8, and 15 to include the recitation of structure. More particularly, claim 1 has been amended to recite at least an oscillator circuit and a microcontroller. Claim 6 has been amended to recite an oscillator circuit, a ROM-based circuit, and a microcontroller circuit, as has claim 8 and claim 15. Claim 11 has been amended to include the necessary antecedent basis for "the first distance" and "different modes of operation."

Rejections on the Merits

Representative embodiments of the invention will now be discussed in comparison to the applied references. Of course, the discussion of the representative embodiments and the discussion of the differences between these embodiments and the subject matter described in the applied references does not define the scope or interpretation of any of the claims. Rather, such differences discussed herein are to assist the Examiner in appreciating important claim distinctions discussed thereafter.

In the representative embodiments of the present invention, multiple modes of operation are enabled by the strength of a received radio frequency signal. More particularly, when the radio frequency identification transponder is within a first range of the radio frequency signal, the transponder is enabled in a first mode of operation, such as a read operation. As the transponder moves closer to the source of the signal, the signal strength increases, providing more energy to the transponder. As the energy from the received signal increases, the transponder is capable of functioning in a second mode of operation that includes read and write operations. As the received signal strength increases, such as when the transponder moving closer to the signal source, a second circuit in the transponder, such as a ROM-based circuit, becomes enabled and operates either in combination with the oscillator circuit or by itself while the oscillator circuit is disabled. In yet another mode of operation, a microcontroller on the transponder is enabled for operation alone or in combination with the oscillator and the ROM-based circuit as the transponder moves yet even closer to the signal source and receives additional energy from the received signal.

Iiyama et al., U.S. Patent No. 6,489,883, is directed to a non-contact data carrier system that only switches between power sources. It does not provide for or describe changing the operational status or mode of the non-contact data carrier in accordance with the strength of a received signal. More particularly, Iiyama et al. describe an object of their invention as preventing "a trouble caused by battery exhaustion of the non-contact IC card while maintaining the convenience that long distance communication can be performed" (*see* column 2, lines 47-50). Iiyama et al. further describe using a "switching means for supplying power of an internal battery to a main circuit when the carrier signal is detected, electric-supply means for rectifying

the carrier signal and generating a voltage" in which the "electric-supply switching means compares a voltage value of the battery and a voltage value of the electric-supply means, and switches between the battery and the electric-supply means." (*See* Iiyama et al., column 4, lines 1-10.) Moreover, at column 6, lines 47-57, Iiyama et al. teach:

> The electric-supply switching circuit 9 compares the value of the voltage of the battery 29 supplied by way of the switching circuit 8 and the value of the voltage supplied from the electric-supply circuit 4. When the voltage applied from the battery is higher than the voltage supplied from the electric-supply circuit 4, power is supplied from the battery 29 to the main circuit unit 13 like in the conventional non-contact IC card incorporating a battery. Since the battery 29 outputs a stable voltage, the non-contact IC card can operate even when the question unit is away from the non-contact IC card.

Nowhere do Iiyama et al. teach or suggest an RF transponder having multiple modes of operation based on signal strength wherein one or more of an oscillator, a ROM-based circuit, and a microcontroller operate distinctly or in combination based on signal strength.

Vercelotti et al., U.S. Patent No. 5,317,309 is directed to a dual-mode electronic identification system that has a first mode in which a tag responds to an interrogation signal by transmitting identification data to the interrogator and a second mode in which the tag actively transmits an identification beacon signal to a directional sensing antenna in which power is provided from either an internal battery or from the signal via a tag receiving antenna. (*See* Vercelotti et al. Abstract.) While Vercelotti et al. does show the use of an oscillator 16 in Figure 2, nowhere do Vercelotti et al. teach or suggest that the oscillator 16 can be controlled in its operation by the strength of the received signal. Rather, Vercelotti et al. teach that the oscillator, as well as a CMOS ASIC 14 and a RAM memory chip all function from stored energy, such as a capacitor 21 or a battery 19, or from active energy received from the loop stick 18 antenna. Nowhere do Vercelotti et al. teach or suggest each of the circuit components operating distinctly and individually and in combination based on strength of the received signal only.

Miyamoto, GB 2292866, is directed to a power supply for a non-contact IC card that includes a rectifier 18 and a capacitor 19 that provide power to the card by rectification of a received communication signal 20, and a battery 1 that acts as a backup power supply for data stored in a RAM 7 and powers the card when the received electromagnetic wave 20 is weak.

Miyamoto further describes the battery 1 as a primary battery with switching between two power supplies being effected by a diode 2 or by an IC power control chip 14. Nowhere does Miyamoto teach or suggest a CPU 5, ROM 6, RAM 7, or modulation/demodulation circuit 3 each operating independently and in various combinations based only the strength of the signal. Rather, Miyamoto specifically teaches the use of a battery backup that supplies power to all of the components when the power from the received signal is insufficient to operate all of the components.

Turning to the claims, claim 1 is directed to a transponder device that comprises a radio frequency identification transponder having at least an oscillator circuit and a microcontroller configured to operate in at least one of a plurality of modes of operation and to change modes of operation in accordance with the strength of a received signal, the modes of operation including at least one of a first mode in which the oscillator operates and the microcontroller does not operate in response to a first strength of the received radio signal, and in a second mode in which the oscillator and the microcontroller both operate in response to a second strength of the received radio signal. As discussed above, nowhere do Iiyama et al., Vercelotti et al., or Miyamoto, taken alone or in any combination thereof, teach or suggest multiple modes of operation of an oscillator circuit and a microcontroller based on the strength of the received signal. For the reasons discussed above, applicants respectfully submit that claim 1, as well as dependent claims 2-5, are clearly allowable.

Independent claim 6 is directed to a transponder device comprising a radio frequency identification tag configured to operate in a passive mode for backscatter operations and to operate in an active mode for transmission of a radio frequency signal, the active and passive mode selected in response to a received radio frequency interrogation signal. Claim 6 further recites the tag comprising an oscillator circuit, a ROM-based circuit, and a microcontroller circuit that are each configured to operate in response to the strength of the received signal only. As discussed above with respect to claim 1, nowhere do Iiyama et al., Vercelotti et al., or Miyamoto, taken alone or in any combination thereof, teach an oscillator circuit, a ROM-based circuit, and a microcontroller circuit embodied in a radio frequency identification tag that are each configured to operate in response to the strength of the received

signal. Rather, all of these references teach switching between a power source and power extracted from an interrogation signal and not in response to the strength of the received signal only. Applicants respectfully submit that claim 6 and dependent claim 7 are clearly allowable over the cited references.

Independent claim 8 is directed to a transponder device for operation in conjunction with a radio frequency signal source, the device including a radio frequency identification tag that is configured to operate in three modes of operation in response to three corresponding distances from a radio frequency signal source. The modes of operation include a first mode in which an oscillator circuit operates, a second mode in which a ROM-based circuit operates, and a third mode in which a microcontroller circuit operates, all in response to the strength of the received signal. Nowhere do Iiyama et al., Vercelotti et al., or Miyamoto teach or suggest such a transponder device. Applicants respectfully submit that claim 8 and dependent claims 9-10 are allowable over these references.

Independent claims 11 and 15 are directed to a radio frequency transponder architecture and a communication system, respectively, that include a transponder having a radio frequency identification tag with multiple modes of operation utilizing an oscillator circuit, a ROM-based circuit, and a microcontroller circuit, all operating in response to varying strengths of the received signal. Applicants respectfully submit that claims 11 and 15, as well as all claims depending therefrom, are clearly allowable for the reasons discussed above.

In view of the foregoing, applicants respectfully submit that all of the claims in this application are in condition for allowance. In the event the Examiner finds minor informalities that can be resolved by telephone conference, the Examiner is urged to contact applicants' undersigned representative by telephone at (206) 622-4900 in order to expeditiously resolve prosecution of this application. Consequently, early and favorable action allowing these claims and passing this case to issuance is respectfully solicited.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC

E. Russell Tarleton
Registration No. 31,800

ERT:alb

701 Fifth Avenue, Suite 6300
Seattle, Washington 98104-7092
Phone: (206) 622-4900
Fax: (206) 682-6031

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